

## Wetmore, Cynthia

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**From:** Jaime Dinello <jdinello@demaximis.com>  
**Sent:** Friday, May 12, 2017 8:36 AM  
**To:** Wetmore, Cynthia  
**Cc:** jerome.zimmerle@aecom.com; mark.riley@aecom.com; Mike.Grigorieff@CH2M.com; Mike Palmer; Chavira, Raymond  
**Subject:** RE: TGRS: Draft Ultrafiltration Membrane Functional Test Plan  
**Attachments:** UF pilot study final - May 11, 2017.final to EPA.pdf

Hi, Cynthia -

Attached is the revised Draft UF Membrane Functional Test Plan. We will provide an anticipated schedule for continued connections on Monday, May 15th.

Kind Regards,  
Jaime

>>> Jaime Dinello 5/11/2017 3:45 PM >>>

Thanks, Cynthia -

We will provide the revised UF Membrane Functional Test Plan tomorrow AM. I believe we need about 1 week to coordinate this work, so it will likely be scheduled for the week of May 22nd. We will confirm and provide in our standard, weekly submittal with Deliverable Tracking Table and will not proceed without providing EPA appropriate notification.

Kind Regards,  
Jaime

>>> "Wetmore, Cynthia" <Wetmore.Cynthia@epa.gov> 5/11/2017 2:59 PM >>>

Jaime,

EPA agrees that Site work can continue to prepare for the Ultrafiltration Membrane Functional Test, as described below. Please note that the 90% design for the UF and Contact Membrane systems has not been submitted or approved, and as such, there may be a need to replace or re-do the work below.

Please keep EPA informed about the schedule for this work.

*Cynthia Wetmore*

Technical Support, US EPA Region 9  
(415) 972-3059

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**From:** Jaime Dinello [mailto:jdinello@demaximis.com]  
**Sent:** Tuesday, May 09, 2017 2:55 PM  
**To:** Wetmore, Cynthia <Wetmore.Cynthia@epa.gov>  
**Cc:** jerome.zimmerle@aecom.com; mark.riley@aecom.com; Mike.Grigorieff@CH2M.com; Mike Palmer <mikepalmer@cox.net>  
**Subject:** RE: TGRS: Draft Ultrafiltration Membrane Functional Test Plan

Hi, Cynthia -

Please see AECOM response to these comments, below (in red). We feel these are relatively minor comments to address and AECOM will be incorporating these responses into a revised Workplan. We are asking that EPA consider

allowing site work to complete the following UF skid connections, in an effort to continue to prepare for this test. Please advise.

UF skid connections would include:

- Connecting the LGAC effluent pipe to the inlet to the UF skids.
- Connecting the UF skid effluent pipe to the inlet to the injection feed tank.
- Connecting the backwash pump to a new flange that will need to be installed at the base of the injection feed tank.
- Cutting the piping after the injection feed pumps to install the tees needed for connection to the DO skid.
- During the test, connecting a temporary hose from the new tee closest to the injection feed pumps, to an existing flange near the LGAC vessels that leads to the overhead piping from the Utility Tank to influent tank B. This will be used to move treated water out of the injection feed tank back to the influent tanks to get the run time we need for two backwash cycles.
- During discharge, connecting the two tees after the injection feed pumps with a temporary pipe to allow the water to reach the injection piping, then to the G-IW-5 bypass to NPDES outfall #8.
- Connecting the power to the UF control panel, so we can run the system locally.

We appreciate your review, and please let us know of any comments/questions.

Kind Regards,

Jaime

>>> "Wetmore, Cynthia" <[Wetmore.Cynthia@epa.gov](mailto:Wetmore.Cynthia@epa.gov)> 5/8/2017 2:46 PM >>>

Jaimie,

EPA has reviewed the Draft Ultrafiltration Membrane Functional Test Plan. The comments on the plan are below. Please revise the test Plan to incorporate the responses to the comments. I can organize a conference call, if you would like to discuss.

1. The responses in your Friday, April 25, 2017 10:08 PM email to EPA are noted and are ok. Please incorporate into the revised Test Plan. **Will incorporate.**
2. Confirm that any solids treatment chemicals (coagulants, polymers) will be compatible the UF and DO membrane materials due to recycling of filtered backwash water to the front end of the treatment plant as planned in full scale operation. **We have discussed any chemicals proposed to-date with the membrane vendor and will continue to do so as additional coagulants or polymers are identified. Note that the volume of recycled water is limited in comparison to the total volume treated and that the water is treated by the HiPOx, air stripper and carbon prior to reaching the membranes, so the mass of recycled coagulant/polymer will be limited/reduced as the water is processed.**
3. Clarify the representativeness of the water to be used for backwash testing:
  - a. What amount of water is currently in the treatment plant? Are all tanks empty or do some have water from past testing that might be co-mingled with fresh GW? **We currently have 21,000 gallons total in the tanks, majority of total in influent tank (10,000 gals, which is roughly what we want) and utility tank (7,000 gals).**
  - b. The text states that the first 37 minutes of GW extraction will be used for flushing the pipelines and TGRS equipment; 37 minutes of extraction out of 150 minutes of total extraction time represents  $\frac{1}{4}$  of the water to be collected. This is stagnant water that may have different characteristics from fresh extracted water. Thus, your test water may be a mixture of  $\frac{1}{4}$  old stagnant water +  $\frac{3}{4}$  fresh water. Once water is in the GWTS equipment, stagnant water does not get flushed out, it simply gets mixed and get diluted over time. This may not be a big issue, however, this could impact the quality of the water being used for testing. **For the purposes of these tests, we account for this by**

delaying the sampling until the end of the processing period for each treatment system. Plus we just ran a test in March, so the lines were flushed for over an hour then. Note that the 37 minutes is for the farthest well, other wells take less time, so fresh groundwater from individual wells is being added to the pipe within 10 minutes of starting the extraction pumps.

- c. Will coagulant be **added to the UF feed** to mimic actual planned operation of the UF? The coagulant can impact the nature of the solids that are captured by the UF and subsequently backwashed from the UF ( e.g. UF backwash with coagulant treated solids vs. UF backwash with non-coagulant treated solids); this potential difference in backwash solids characteristics may affect the jar testing to be done to help assess polymer/coagulant/pH combinations for removal of backwash solids in the proposed solids separation system (inclined plate separator/filter press). **Coagulant will be added.**
4. Clarify if there will be any attempt to jar test the two types of backwash solids: 1) settled solids withdrawn from the bottom of the coned bottom utility tank, and 2) more dilute solids withdrawn from the top of the coned section of the utility tank ( e.g. as planned in actual operation)? Clarify if these are identified in Attachment A2 for the sample locations identified as 1) Utility Tank Backwash Solids and 2) Utility Tank Backwash Water. **For this test we will only be sampling the solids produced by the backwash system as a total, additional samples will be collected once the remaining proposed components are in place.**
5. In Attachment A2, clarify the sample location identified as Utility Tank Backwash Water. Is this the backwash going to the utility tank or is it the “decanted” water after settled solids have been removed? **Sample of the backwash water/solids mix from the tank after the second backwash cycle. So the backwash water/solids mix would be in the Utility Tank for just over an hour for the first cycle, minutes for the second. The intent was to send a water with solids to the laboratory, have it filtered there as necessary for the methods and to produce a solids sample for testing.**
6. Clarify if jar testing will be done by the vendor onsite or offsite. EPA may want to observe the testing if it is to be done in the field. As such, please revise the work plan to give EPA seven days notice – not 24 hours, as currently stated in Test Plan. **Plan is to have the vendor on-site pending test timing and subcontractor availability. Work plan will be revised to include seven day notice.**
7. The backwash pilot test plan states that about 8,500 gallons of water will be left in Tank A (3710A) to provide sufficient volume to be able to recirculate the water through the HiPOx for maintenance purposes. Although not part of the UF backwash pilot test, please clarify the nature of the HiPOx maintenance procedures (Periodic recirculation? How frequent? Etc.) **Recirculation through the HiPOx every 2 to 3 weeks as a way to exercise the HiPOx components.**
8. EPA would appreciate the results from the laboratory testing for the NPDES permit; however, since EPA is not overseeing the permit, EPA will not review or approve. EPA needs at least 3 days notice prior to discharge. **Understood.**

*Cynthia Wetmore*

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**From:** Jaime Dinello [<mailto:jdinello@demaximis.com>]

**Sent:** Friday, April 28, 2017 3:17 PM

To: Wetmore, Cynthia <[Wetmore.Cynthia@epa.gov](mailto:Wetmore.Cynthia@epa.gov)>

Cc: [jerome.zimmerle@aecom.com](mailto:jerome.zimmerle@aecom.com); [mark.riley@aecom.com](mailto:mark.riley@aecom.com); [Mike.Grigorieff@CH2M.com](mailto:Mike.Grigorieff@CH2M.com); Mike Palmer <[mikepalmer@cox.net](mailto:mikepalmer@cox.net)>

Subject: TGRS: Draft Ultrafiltration Membrane Functional Test Plan

Hi, Cynthia -

Per your request, attached is the Draft Ultrafiltration Membrane Functional Test Plan. I have copied related correspondence/previous email chain below. Hoping that helps to track comments.

Have a great weekend,  
Jaime

>>> Jaime Dinello 4/25/2017 10:08 PM >>>

Hi, Mike and Cynthia -

AECOM has prepared responses to your initial comments/questions on the proposed UF backwash testing - please see below, in red. A brief testing plan is forthcoming.

Kind Regards,

Jaime

>>> "Grigorieff, Mike/SCO" <[Mike.Grigorieff@CH2M.com](mailto:Mike.Grigorieff@CH2M.com)> 4/24/2017 6:28 PM >>>

Jerry.

Silica solids seems to be a driver for the backwash system based on previous documentation you have provided. Will you be doing additional testing for silica content in the plant (both soluble and particulate) in influent to TGRS, in feed to UF, in backwash water, and UF effluent, or will you just be focusing on particulates? The silica data collected to date seems very strange in that some of the influent TGRS GW silica concentration seems to be in the 30 ppm range, and then increases to 70-80 ppm range within the plant, and is apparently mostly in the form of particulate silica. **We're going to sample all the extraction wells for total and dissolved silica in this next sampling event, and will also be taking more total and dissolved silica samples within the TGRS during these functional tests to continue to build our database. Membrana considers the silica to be in a >0.02 micron colloidal form based on their data, which is consistent with our data showing a 1 micron filter had minimal change in silica concentrations. Final note, we're not seeing much difference in total vs. dissolved silica, likely due to the fact that labs use a 2.5 micron filter for dissolved metals**

Representativeness of the water remains a concern even though you plan to run the system for about 2.5 hours. It takes time for a stagnant system to reach equilibrium due to transient conditions such as settled solids in equipment/tankage that might get re-suspended partially over time, sloughing-off of particulates off equipment that has been idle, especially from the stagnant LGAC system. Your 30% design included relocation of some of the bag filters, however, it is not clear if these will be in their proper location for this backwash testing effort. **No bag filters are proposed for the water only backwash given the quantity of expected solids - up to 1,000 lbs per day - which is why we are proposing the solids separation systems. During the recently completed peroxide test, the water from the post-LGAC port was clear, so we are not seeing significant particle/slough releases. For the UF backwash test, we will be generating 4600 gallons of backwash water and an estimated 100 pounds of backwash solids. Therefore, I would expect that any minor amounts of slough that might occur would not affect the test results, and the water/solids would still be representative.**

Also,

- Clarify where the backwash will be sampled, e.g. While flowing into the utility tank? From backwash collected in the utility tank? If from the utility tank---is the tank clean and free of sludge or slime buildup from past operations so that your samples are truly representative? **The Utility Tank will be empty. If necessary we can run potable water into the tank to flush it out. However, as noted above, we will be generating 4600 gallons of backwash water and an estimated 100 pounds of backwash solids. Minor amounts of slough will not affect the test results.**

- One of your bulleted items below which I highlighted in yellow color discusses additional data collection pre- and post- LGAC. What specific data will you be collecting? Post LGAC as pre-UF and injection feed tank as post UF - VOCs, pCDSA, SDI, alkalinity, hardness, metals, common anions. Should give us a good idea of how the UF systems changes the water.
- One of your bulleted items below which I highlighted in green color discusses lab analysis and jar testing of polymers/coagulants, etc. Is there a written test plan for this part of your work? Who will be doing this jar testing? An equipment vendor? A chemical supplier? Your own lab? The filter press vendor has a local chemical supplier that he has used in the past and who has a portable jar testing setup, so they can do the work at the site or we can send them water and solids to work with at their facility. We will use their standard protocols for testing.

I am hoping the backwash testing plan that you are working on will consider and address these issues and provide more clarity.

Regards,

Mike

Mike Grigorieff, P.E.  
Senior Technologist  
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**From:** Zimmerle, Jerome [<mailto:jerome.zimmerle@aecom.com>]

**Sent:** Monday, April 24, 2017 4:53 PM

**To:** Grigorieff, Mike/SCO <[Mike.Grigorieff@CH2M.com](mailto:Mike.Grigorieff@CH2M.com)>

**Cc:** Jaime Dinello <[jdinello@demaximis.com](mailto:jdinello@demaximis.com)>; Mike Palmer <[mikepalmer@cox.net](mailto:mikepalmer@cox.net)>; Wetmore, Cynthia ([Wetmore.Cynthia@epa.gov](mailto:Wetmore.Cynthia@epa.gov)) <[Wetmore.Cynthia@epa.gov](mailto:Wetmore.Cynthia@epa.gov)>

**Subject:** Fw: TGRS: Interim Action Items [EXTERNAL]

Mike G., did you get this one? That's the only other one from today that I see immediately. I'll work with Jaime until this gets fixed.

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**From:** Jaime Dinello <[jdinello@demaximis.com](mailto:jdinello@demaximis.com)>

**Sent:** Monday, April 24, 2017 10:52 AM

**To:** [Wetmore.Cynthia@epa.gov](mailto:Wetmore.Cynthia@epa.gov)

**Cc:** Zimmerle, Jerome; [Mike.Grigorieff@CH2M.com](mailto:Mike.Grigorieff@CH2M.com); Mike Palmer

**Subject:** TGRS: Interim Action Items

Hi, Cynthia -

The final response to EPA comments on the 30% DO/UF design were submitted on Friday, April 21st. We are anticipating final review, clarification, and approval to incorporate changes into the 90% design by April 28th. As we discussed, AECOM is prepared to

provide the 90% design within 1 week of approval of the 30% design. However, it appears there may be a government shut down and EPA/CH2M may not be able to begin review of the 90% DO/UF design until May 8th. We would like to move forward with some preparatory items for the Additional Functional Test in May, and believe that these items would not specifically require EPA oversight.

- Sampling of Extraction Wells and Monitoring Wells identified in the Additional Functional Test Workplan, submitted on March 31st.
- Video Survey and possible rehabilitation of western injection wells, if needed.
- Ultrafiltration backwash testing.

The purpose of the UF backwash testing is to connect the UF skids to the system and run enough water to get a representative backwash. This will help with data for design of permanent inclined plate/filter press. We would essentially need to make appropriate connections to the LGAC vessels, Injection Feed Tank, and Utility Tank; supply power to the UF skids and operate under local control; and conduct appropriate sampling for NPDES discharge. A brief summary of the anticipated plan, or scope of work, is provided below.

- Operate at 700 gpm for 2.5 hours to give us two backwash cycles
- Collect data for NPDES, VOCs and pCBA at the normal sampling points
- Collect some additional data post-LGAC and out of the injection feed tank for pre- and post-UF samples
- Collect some solids and backwash water for lab analysis and jar testing to see what mix of polymers/coagulants/pH might give us the best solids removal
- Discharge to storm drain #8
- Conduct this as a water only backwash since we won't have the neutralization system in place, automated UF operation, and not proposing to use the DO membranes

Thank you for your consideration, and we look forward to discussing this with you on today's call.

Kind Regards,

Jaime